

STEREO MOC Status Report
Time Period: 2017:044 - 2017:050

STEREO Ahead (STA) Status:

1. The following Ground System anomalies/events occurred during this reporting period:

- On day 045, during the DSS-63 support, a DSN demonstration test was conducted to verify end-to-end tracking, telemetry, and commanding utilizing test TTC software V1.3. As this was a test track, there was no SSR playback or instrument commanding. All required and planned activities were executed as planned.
- On day 045, during the DSS-14 support, symbol lock was lost beginning at 2327z through 2330z due to an intermittent receiver issue. Later in the support, turbo decoder lock was lost intermittently between 046-0134z through 0153z. These anomalies resulted in the loss of 6100 frames of real-time telemetry and SSR data. See DR# G117907 for more information.
- On day 048, during the DSS-36 support, turbo decoder lock was lost intermittently between 2324z through 049-0146z due to periods of rain at the Canberra complex. This anomaly resulted in the loss of 8542 frames of real-time and SSR data. See DR# N110535 for more information.

2. The following spacecraft/instrument events occurred during this week. The Ahead observatory operated nominally during this week.

- On day 048, the 96th momentum dump was executed successfully at 1930z, which imparted an estimated delta V of 0.093 m/sec. This was the 15th momentum dump that did not use the IMU. After thruster operations completed, there was a 1.05 degree of roll angle error which was dampened out over the next 7.25 minutes. Fine pointing stabilized 2.8 minutes after completion of the momentum dump.
- On day 049, the SECCHI instrument reset at 22:27:11z. The SECCHI team reconfigured the instrument to operational mode by 050-1400z. This was the 43rd reset of SECCHI on the Ahead observatory.

- The average daily science data return for Ahead was 5.3 Gbits during this week.

STEREO Behind (STB) Status:

1. Detailed status of the recovery activities this week to restore operations is listed below.
 - On day 048, during a 3.75 hour support with the 34m station DSS-26 using the 80 KW transmitter to minimize 70m contentions, 400 commands were transmitted during the support. No carrier was detected by either the DSN station or the radio science receiver team after attempting to power on the TWTA for 30 minutes. Transitioned to battery recovery operations for the remainder of the support which consists of repeatedly sweeping a 3 kHz uplink range and sending commands for IEM switched power and PDU 1553 interface bus off.
 - On day 049, during a 3.75 hour support with the 34m station DSS-26 using the 80 KW transmitter to minimize 70m contentions, 400 commands were transmitted during the support. No carrier was detected by either the DSN station or the radio science receiver team after attempting to power on the TWTA for 30 minutes. Transitioned to battery recovery operations for the remainder of the support which consists of repeatedly sweeping a 3 kHz uplink range and sending commands for IEM switched power and PDU 1553 interface bus off.
 - On day 050, during a 4 hour support with DSS-14, 420 commands were transmitted during the support. No carrier was detected by either the DSN station or the radio science receiver team after attempting to power on the TWTA for 30 minutes. Transitioned to battery recovery operations for the remainder of the support which consists of repeatedly sweeping a 3 kHz uplink range and sending commands for IEM switched power and PDU 1553 interface bus off.
2. The Behind loss of communication anomaly occurred on October 1, 2014. Post superior solar conjunction, recovery operations resumed on November 30, 2015. By implementing the NASA Failure Review Board recommendations, the first recovery attempt began with carrier detection by the DSN on August 21st, through September 23, 2016. At a spacecraft range of ~2 AU,

the observatory was found to be rotating slowly about its principal axis of inertia for which the uncontrolled attitude allowed some solar array input and continuous uplink and downlink communications on the LGA at emergency data rates. Over the next 22 continuous days, significant obstacles to recovery were overcome with a collaborative effort of the JHU/APL engineering team, NASA GSFC, DSN, FDF, SSMO scheduling, and Mission Operations teams. This consisted of:

- Reliably commanding a rotating spacecraft with uncontrolled attitude at a distance of 2 AU
- How to power on the spacecraft that was never designed to be off without collapsing the battery voltage
- Acquiring telemetry at 35 bps from a spacecraft that is rotating with an uncontrolled attitude
- Warming a frozen propulsion subsystem with a degraded battery and limited solar array input with an uncontrolled attitude
- Configuring, loading, and verifying EA, C&DH, and G&C parameters and macros with very limited telemetry
- Conducting an autonomous momentum dump in the blind and transitioning to C&DH standby mode and successfully receiving telemetry on the HGA indicating star tracker lock and decreasing system momentum.

However, system momentum level remained above the threshold for re-establishing attitude control with the reaction wheels. Due to the uncontrolled attitude, communication degraded and the last detection of the carrier was on September 23rd.

Behind Observatory Status - From the last telemetry received on September 18th, main bus voltage is low, 2 out of 11 battery cells are currently not functioning, attitude remains uncontrolled, rotating at a ~45 second period about its principal axis of inertia. While propellant is suspected to be frozen, last telemetry indicated both propulsion tank latch valves are open and pressure transducer #2 is not functioning. EA mode is enabled. The battery charge rate is C/10. Necessary macro sequences have been tested to allow the peak power tracker in C&DH standby mode to protect the battery. These macro sequences will be loaded to EEPROM when the communications supports longer commands.

Monthly recovery efforts consist of attempting to power on the transmitter for 30 minutes. If no carrier signal is detected, battery recovery operations will commence which consist of

repeatedly sweeping a 3 kHz uplink range and sending commands for IEM switched power and PDU 1553 interface bus off. The next recovery tracks are on March 17th, 18th, and 19th. A subsystem telemetry assessment review of the limited telemetry received during the 1st Behind recovery attempt will be held on February 24th.